REMARKS

In the Office Action, the Examiner rejected claims 1 -27 under 35 USC 103. The rejections are traversed below.

Claims 28 – 31 of the present application were not rejected in the outstanding office action. Therefore, it is assumed that these claims are allowable.

Claims 14, 15, 18 and 20 have been amended. Thus, claims 1-31 are pending in the application. Reconsideration of the application is respectfully requested based on the following remarks.

Claim Rejections – 35 USC 101

It is believed that the rejection is moot based on the amendments made above.

Claim Rejections – 35 USC 112(2)

It is believed that the rejection is moot based on the amendments made above.

Claim Rejections – 35 USC 103

Claims 1-27 have been rejected under 35 U.S.C. 103(a) as being unpatentable over *Littau* (6,429,930) in view of *Singh* (6,650,422).

The present invention is directed, in one example, at monitoring, optimizing and controlling photolithographic processes using scatterometry measurements and carefully designed grating structures. In the present invention, each of the grating structures includes at least one grating parameter that is sensitive to a process parameter and that is deliberately made different so that the effects of the process parameters on them are different. At least a portion of the remaining grating parameters are made similar so that the effects of the process parameters on them are similar. As a result, the measured scatterometry spectra from each of the grating structures has both similarities and differences. When the spectra are subtracted from one another, the similarities are cancelled out thereby leaving the difference. Because the difference is attributable to the process parameters it contains information about the process parameters. As

such, the difference or some property thereof can be analyzed to determine information about the process parameters. This information may be subsequently used to control the process parameters in order to keep the quality of the process within an acceptable level.

Littau is directed at determining the center of focus by diffraction signature analysis. This is accomplished by forming a plurality of diffraction gratings at different known focus settings and determining the two adjacent focus setting diffraction gratings where the difference between the diffraction signatures is less than the difference of the diffraction signatures between other adjacent focus setting diffraction gratings.

Singh is directed at scatterometry techniques to ascertain asymmetry profile of features and generate feedback or feed forward process control data associated therewith. This is accomplished by correlating measured data with data associated with known feature profiles to ascertain profile characteristics associated with the feature of interest. Using the profile characteristic, an asymmetry of the feature is determined which is then used to generate feedback or feed forward process control data to compensate for or correct for the asymmetry in subsequent processing.

In contrast to both references, claim 1 (and its dependents) specifically requires, "...two grating structures with different process responses..." While *Littau* may disclose forming a plurality of diffraction gratings and determining the difference between diffraction signatures of the diffraction gratings, *Littau* does not teach or suggest forming diffraction gratings with different process responses. In *Littau*, the diffraction gratings are formed from the same pattern and thus they have the same response to a given set of process parameters. In order to get differences between diffraction gratings, *Littau* varies the focus setting for each diffraction grating. As stated in *Littau*, "...forming the plurality of diffraction gratings utilizing the lithography device at different known focus settings...(Col. 3 lines 53-56)." It should be appreciated that this is one example, and that *Littau* repeatedly describes varying the focus for each grating. It should be emphasized that varying the focus is NOT utilizing different process responses. *Singh* does not overcome the deficiencies of *Littau*. *Singh* only describes measuring a single feature from opposite sides to determine asymmetry of the feature. Accordingly, the rejection is unsupported by the art and should be withdrawn.

In contrast to both references, claim 14 specifically requires, "...each of the grating structures being configured with different sensitivities to one or more process parameters which are desired to be controlled..." Again, neither reference teaches or suggests gratings with different characteristics. Accordingly, the rejection is unsupported by the art and should be withdrawn.

In contrast to both references, claim 15 (and its dependents) specifically requires, "...the target group containing two or more targets with different sensitivities to focus..." Neither reference teaches or suggests targets with different characteristics. Accordingly, the rejection is unsupported by the art and should be withdrawn.

In contrast to both references, claim 18 specifically requires, "...measuring two or more measurable patterns that are configured with different process responses so as to produce different scatterometry signals for a given set of process conditions..." See arguments above. Accordingly, the rejection is unsupported by the art and should be withdrawn.

In contrast to both references, claim 19 (and its dependents) specifically requires, "...two or more scatterometry targets configured to have different process responses..." See arguments above. Accordingly, the rejection is unsupported by the art and should be withdrawn.

With regards to the above, it should further be emphasized that *Littau*'s method is not a method used for in production process control. As mentioned, *Littau* adjusts focus settings, which teaches against such a method. This deficiency cannot be overcome by *Singh*, e.g., the combination is improper.

Although the rejections to the dependent claims should be withdrawn for at least the reasons as above, it should be noted that they offer additional language that is unsupported by the art.

SUMMARY

Applicant believes that all pending claims are allowable and respectfully requests a Notice of Allowance for this application from the Examiner. Should the Examiner believe that a telephone conference would expedite the prosecution of this application, the undersigned can be reached at the telephone number set out below.

Respectfully submitted,
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